PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Tonis Kasvand Docket: 8673-118 (8061-603 SJP:kl)

Serial No.: 09/832,619 Dated: June 14, 2005

Filed: April 11, 2001

For: DYNAMIC RULE SETS FOR GENERATED LOGS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBMISSION OF PRIORITY DOCUMENT

Sir:

Attached herewith is a certified copy of United Kingdom No. 0008952.4 filed April 12, 2000 from which priority is claimed in the above-identified application under 35 U.S.C. §119.

Respectfully submitted,

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Dated: 6/14/05

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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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Dated 20 April 2001

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Patents Form 1/77

The Patent Office

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form.)

The Patent Office
Cardiff Road
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Gwent NP9 1RH

12 APR 2000

Your reference 625 P/3032(7383)

2. Patent application number *(The Patent Office will fill in this part)* **0008952.4**

3. Full name, address and postcode of the or each applicant *(underline all surnames)*

Mitel Corporation
350 Legget Drive
PO Box 13089
Kanata, Ontario
K2K 2W7, Canada

Patents ADP number *(if you know it)* 607671002

If the applicant is a corporate body, given the country/state of its incorporation: Canada

4. Title of the invention: DYNAMIC RULE SETS FOR GENERATED LOGS

5. Name of your agent ~~Stephenson Harwood~~ Kilburn & Strode

"Address for service" in the United Kingdom to which all correspondence should be sent ~~One, St. Paul's Churchyard London EC4M 8SH~~ 20 Red Lion Street London WC1R 4PJ

Patents ADP number ~~05888038001~~

	Country	Priority application number	Date of filing *(day/month/year)*
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number			

	Number of earlier application	Date of fil *(day/month/year)*
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application		

P1\2015730.1

8.	Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if: a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not*	Yes

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document.

Continuation sheets of this form	
Description	4
Claims(s)	3
Abstract	1
Drawing(s)	5

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	1
Request for preliminary examination and search *(Patents Form 9/77)*	1
Request for substantive examination *(Patents Form 10/77)*	
Any other documents	

11. I/We request the grant of a patent on the basis of this application.

Signature [signature] Date: 12th April 2000

12. Name and daytime telephone number of person to contact in the United Kingdom

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0171 329-2115

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P1\2015730.1

Dynamic Rule Sets for Generated Logs

Field of the Invention

This invention relates in general to network diagnostics, and more particularly to a network administration system for automatically activating dynamic rule sets in response to satisfying the criteria of existing static rule sets of error logs in a network.

Background of the Invention

It is well known in traditional computer and digital communication networks for technicians to respond to the generation of error logs by notifying affected users of system problems, analyzing and then fixing the problems using an assortment of software commands and/or tools. The use of such software commands is often repetitive and requires the technician to manually enter the commands upon each observation of a specific log. Thousands of logs can be generated by a single problem. For example, if a T1 line goes down, error logs could be generated by thousands of phones that cannot find a dial tone.

Therefore, according to the prior art, automatic filtering of error logs has been effected through the use of "rule sets" to determine if a combination of logs satisfies a given criteria. One example of such an automated process is a product from Plexis (http://www.triadhc.com/edi.shtml) called Plexis EDI Toolkit. If the criteria is satisfied, it is known in the art either to generate a further log or to provide an overall summary for describing the problem to the technician. Thus, it is known to generate Higher Level Logs (HLL) from Lower Level Logs (LLL) in response to predetermined rule sets being satisfied. The Lower Level Logs (LLL) are generated by network applications or devices. Such systems are valuable because the HLLs help to explain to the system administrator/designer what is really going on in the system.

There are instances where HLL's generate more HLL logs, or combinations of LLL's and HLL's generate new HLL's. According to the prior art, these rule sets are either manually applied by the technician as required, which can be a time consuming and complicated task where many logs have been generated, or the rule sets remain

activated at all times, in which case analysis of the logs becomes time consuming since many rule sets need to be examined.

Summary of the Invention

According to the present invention, a network administration system is provided for automatically activating and deactivating dynamic rule sets when specified static rule sets have been satisfied. The static rule sets whose criteria have been satisfied by the generation of predetermined error logs trigger activation or deactivation of the dynamic rule sets. The automatic activation and deactivation of dynamic rule sets alleviates time consuming manual application of rule sets. The causal activation and deactivation of the dynamic rule sets only when other rule set criteria have been satisfied reduces the number of rule sets when compared to the prior art approach of activating all rule sets at all times.

The system of the present invention may advantageously be applied to any application that generates logs and is monitored by rule sets, to allow dynamic variations in monitoring when different problems arise, and to set explicit instructions for specific circumstances of logs.

Brief Description of the Drawings

A detailed description of the preferred embodiment is set forth herein below with reference to the following drawings, in which:

Figure 1 is a block diagram of an exemplary network incorporating the system of the present invention;

Figure 2 is a table of a set of rules that have been defined for use in the network of Figure 1;

Figure 3 is a table showing an exemplary list of logs generated by the network of Figure 1;

Figure 4 shows a graphical user interface for entering dynamic rule sets; and

Figure 5 is a flowchart showing activation and deactivation of dynamic rule sets.

Detailed Description of the Preferred Embodiment

Figure 1 shows a typical network comprising a plurality of phones (P1 to P3) connected to a server implemented PBX (PBX 1), a further phone P1 connected to a client server C1, both the client C1 and PBX 1 being connected to a PBX2. The PBX 2 is connected to a T1 trunk in a well known manner. Each of the devices shown in Figure 1, with the exception of the trunk, has the capability of generating logs to inform a technician of the device status. The network configuration is for illustration purposes only, and may incorporate a host of other devices and networks.

As indicated above, Figure 2 demonstrates a set of rule sets that are defined for use in the network in Figure 1, and Figure 3 shows a typical list of logs (HLL's and LLL's) that are generated from the network in Figure 1 as well as associated explanations of how dynamic rule sets are created. The explanation does not form part of the error log, which is restricted to the Log ID, Time Generated and Brief Description. The system parses the Brief Description in order to identify the source of a particular error log.

According to the invention, a network administration system is provided for programming the activation and deactivation of dynamic rule sets in response to network conditions. Thus, with reference to Figure 4, a user interface is provided for activating and deactivating certain rule sets (identified by rule set Ids, such as RSID001, RSID02, etc), and associating rule set activation and deactivation keys. Thus, the rule set identified by RSID001 has been activated by the user and programmed to activate rules sets RSID004 and RS005 when its rule set criteria have been satisfied (i.e. LogP6000 or LogP6001 or LogP6002) have been received from two or more phones). When the criteria for rule set RSID001 have been satisfied, HLL001 will be generated and the Rule Set Status for RSID004 and RSID005 will

change in Figure 2 from OFF to ON. Likewise, when the rule set criteria for RSID004 has been satisfied (i.e. more than one hundred system error logs have been counted), HL004 is generated. The activated rule sets remain active until reset by the user, by another rule set, or by timing out. According to the scenario of Figures 2 – 4, RSID006 has been deactivated by the user. However, if activated by the user this rule set monitors the faulty T1 trunk for activity (i.e. the rule set is Search for > 2 ping T1 logs). The log details of Figure 3 shown LOGT001 being generated three times in succession, thereby satisfying the RSID006 rule set which, according to the user configuration of Figures 2 and 4, results in self-deactivation of the rule set (as well as deactivation of rule set RSID007).

The activation and deactivation of rule sets is triggered by using software tools (e.g. Visual Basic, C++) to read and compare the logs to active rule sets, as shown in Figure 5. If a rule set is fully satisfied, its rule set ID is compared with the rule set Ids of any associated activation keys (as programmed by the user). If the rule set has activation keys programmed, the first such activation key is read, the status of the specified rule set is changed, and remaining activation keys are read and changed in the same manner until no activation keys remain for the rule set.

Exemplary pseudo-code of the process for implementing the network administration system of the present invention is as follows:

```
Dynamic rule sets function prog
        Retrieve log
        Compare logs with rule sets
        If rule set fully satisfied
                If rule set has activation keys
                        Go to first activation key
                        While activation keys exist
                                Set status of specified rule set id
                                Go to next activation key
                        endwhile
                endif
        endif

End dynamic rule sets function prog
```

Alternatives and modifications of the invention are possible within the sphere and scope as set forth in the claims appended hereto.

What is claimed is:

1. A network administration system for automatically activating and deactivating dynamic rule sets in response to receipt of error logs from network devices and applications, comprising:

a user interface for manually activating and deactivating rule sets having defined rule set criteria and for associating rule set activation keys with said rule sets, wherein said activation keys associate changes in status of said dynamic rule sets; and

program means for receiving said error logs and for each of said rule sets in connection with which activation keys have been associated and whose criteria have been satisfied by said error logs, reading said activation keys and one of either activating or deactivating said dynamic rule sets in accordance with said associated changes in status.

2. The network administration system of claim 1, wherein said program means is implemented via pseudo-code comprising:

```
Dynamic rule sets function prog
        Retrieve log
        Compare logs with rule sets
        If rule set fully satisfied
                If rule set has activation keys
                        Go to first activation key
                        While activation keys exist
                                Set status of specified rule set id
                                Go to next activation key
                        endwhile
                endif
        endif

End dynamic rule sets function prog
```

3. A method of activating and deactivating dynamic rule sets in response to receipt of error logs from network devices and applications, comprising the steps of:

activating predetermined rule sets having defined rule set criteria;

associating rule set activation keys with said predetermined rule sets, wherein said activation keys associate changes in status of said dynamic rule sets;

receiving said error logs; and

comparing said error logs with said predetermined rule sets and for each of said rule sets in connection with which activation keys have been associated and whose criteria have been satisfied by said error logs, reading said activation keys and one of either activating or deactivating said dynamic rule sets in accordance with said associated changes in status.

4. A software product for automatically activating and deactivating dynamic rule sets in response to receipt of error logs from network devices and applications, comprising:

a user interface for manually activating and deactivating rule sets having defined rule set criteria and for associating rule set activation keys with said rule sets, wherein said activation keys associate changes in status of said dynamic rule sets; and

program means for receiving said error logs and for each of said rule sets in connection with which activation keys have been associated and whose criteria have been satisfied by said error logs, reading said activation keys and one of either activating or deactivating said dynamic rule sets in accordance with said associated changes in status.

5. The software product of claim 4, wherein said program means is implemented via pseudo-code comprising:

```
Dynamic rule sets function prog
        Retrieve log
        Compare logs with rule sets
        If rule set fully satisfied
                If rule set has activation keys
                        Go to first activation key
                        While activation keys exist
```

Set status of specified rule set id
Go to next activation key
endwhile
endif
5 endif

End dynamic rule sets function prog

Abstract

Dynamic Rule Sets for Generated Logs

A network administration system for automatically activating and deactivating dynamic rule sets in response to receipt of error logs from network devices and applications, comprising a user interface for manually activating and deactivating rule sets having defined rule set criteria and for associating rule set activation keys with the rule sets, wherein said activation keys associate changes in status of the dynamic rule sets, and a program for receiving the error logs and for each of the rule sets in connection with which activation keys have been associated and whose criteria have been satisfied by the error logs, reading the activation keys and one of either activating or deactivating the dynamic rule sets in accordance with the associated changes in status. (Fig. 1)

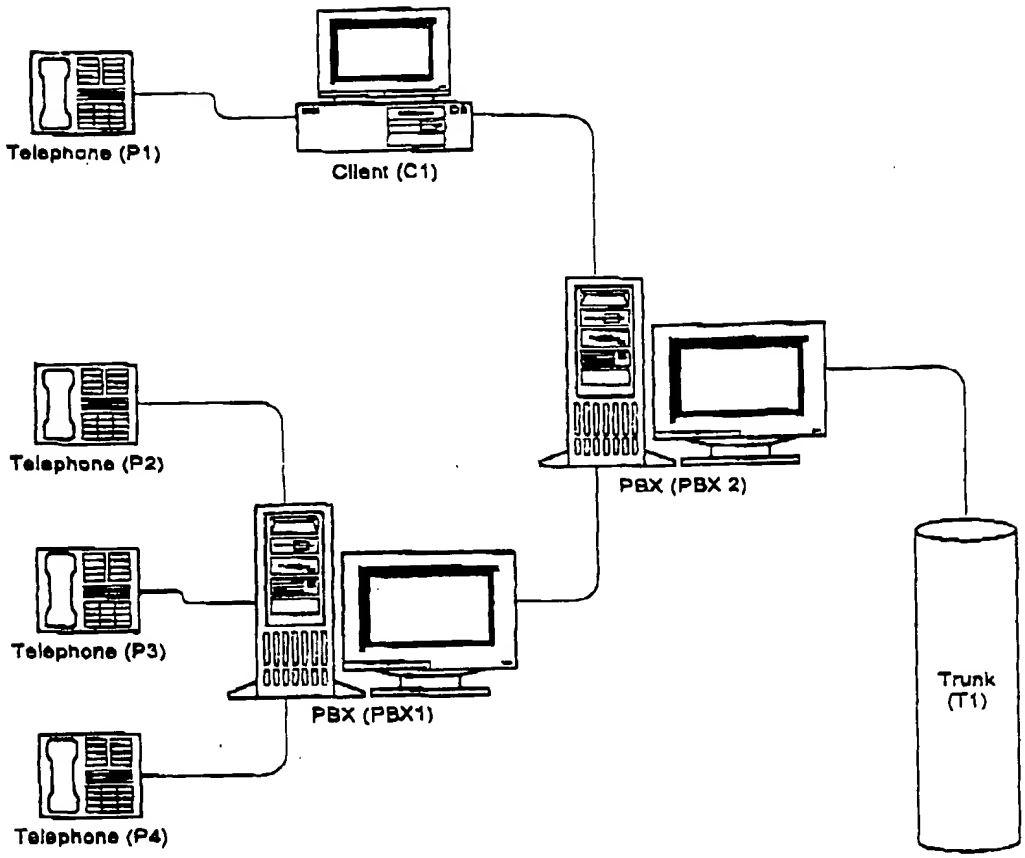

Figure 1

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HLL ID	Rule Set Status	Rule ID	Rule Set Activation Keys		Rule Set Details	Brief Explanation
HLL001	ON	RSID001	RSID004	ON	(LogP6000 or LogP6001 or LogP6002) from 2 or more phones.	Two or more phones are not receiving full services
			RSID005	ON		
HLL002	ON	RSID002	RSID005	ON	LogPBX2000 + LogC3000	Loss of services. Something is wrong with PBX2
HLL003	OFF	RSID003	RSID007	ON	HLL001 + HLL002	Loss of services. Something is wrong with T1 trunk.
HLL004	OFF	RSID004			Count all error logs generated from network up to 100 errors.	Count errors on system. If over 100 errors, issue log HLL004.
HLL005	OFF	RSID005			Count features that are missing up to 10 features	Count features that are missing. If over 10 features, issue log HLL005.
	OFF	RSID006	RSID006	OFF	Search for >2 ping T1 Logs.	Continue to monitor bad T1 trunk for any signs of life.
			RSID007	OFF		
	OFF	RSID007	RSID006	OFF	LogT1003	Status of T1 trunk good.
			RSID007	OFF		

Figure 2

Log ID	Time Generated	Brief Description	Rule Set Explanation
LogP6000	Feb. 29, 2000 14:23:04:12	No dial tone for phone P2.	
LogPBX2000	Feb. 29, 2000 14:23:04:17	PBX 1 is not receiving full services.	
LogP6001	Feb. 29, 2000 14:23:04:27	Reduction of features available for phone P4.	
LogC3000	Feb. 29, 2000 14:23:04:29	Client C1 cannot give services to phones.	
HLL002	Feb. 29, 2000 14:23:04:32	Loss of services on network.	Rule ID RSID002 was satisfied and created this log HLL002. When it created this log it also activated the rule set RSID005.
LogP6002	Feb. 29, 2000 14:23:05:00	No services available for phone P1.	
HLL001	Feb. 29, 2000 14:23:05:03	PBX 1 is not providing full services to phones.	Rule ID RSID001 was satisfied and created this log HLL001. When it created this log it also activated the rule set RSID005.
HLL003	Feb. 29, 2000 14:23:05:05	Trunk T1 is unavailable.	
LOGT1001	Feb. 29, 2000 15:12:00:03	Trunk T1 pinging PBX.	
LOGT1001	Feb. 29, 2000 15:12:00:05	Trunk T1 pinging PBX.	
LOGT1001	Feb. 29, 2000 15:12:00:07	Trunk T1 pinging PBX.	Rule ID RSID006 was satisfied and deactivated the rule RSID006 (itself) and RSID007.
LOGT1003	Feb. 29, 2000 15:13:15:25	Trunk T1 is in full service	

Figure 3

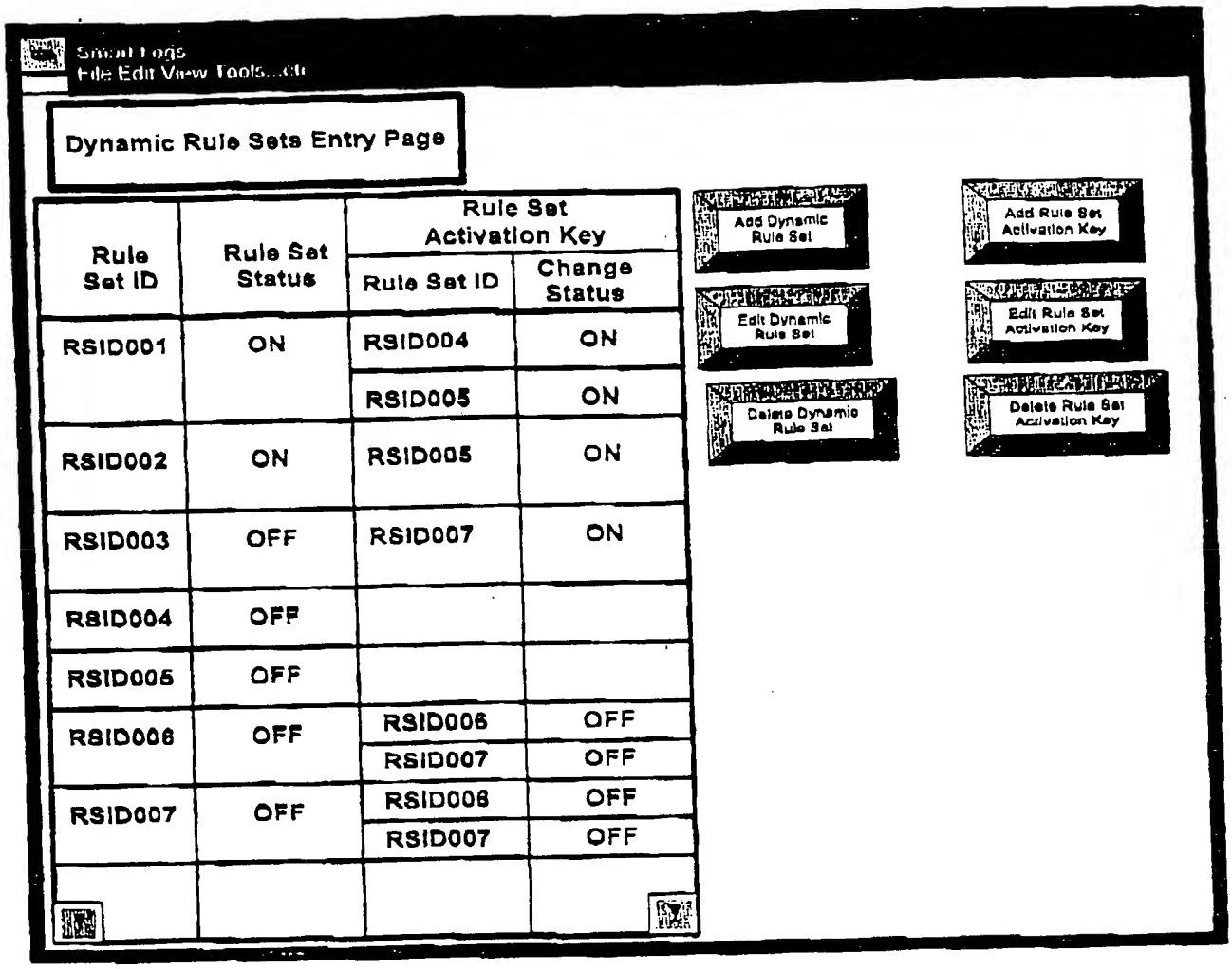

Figure 4

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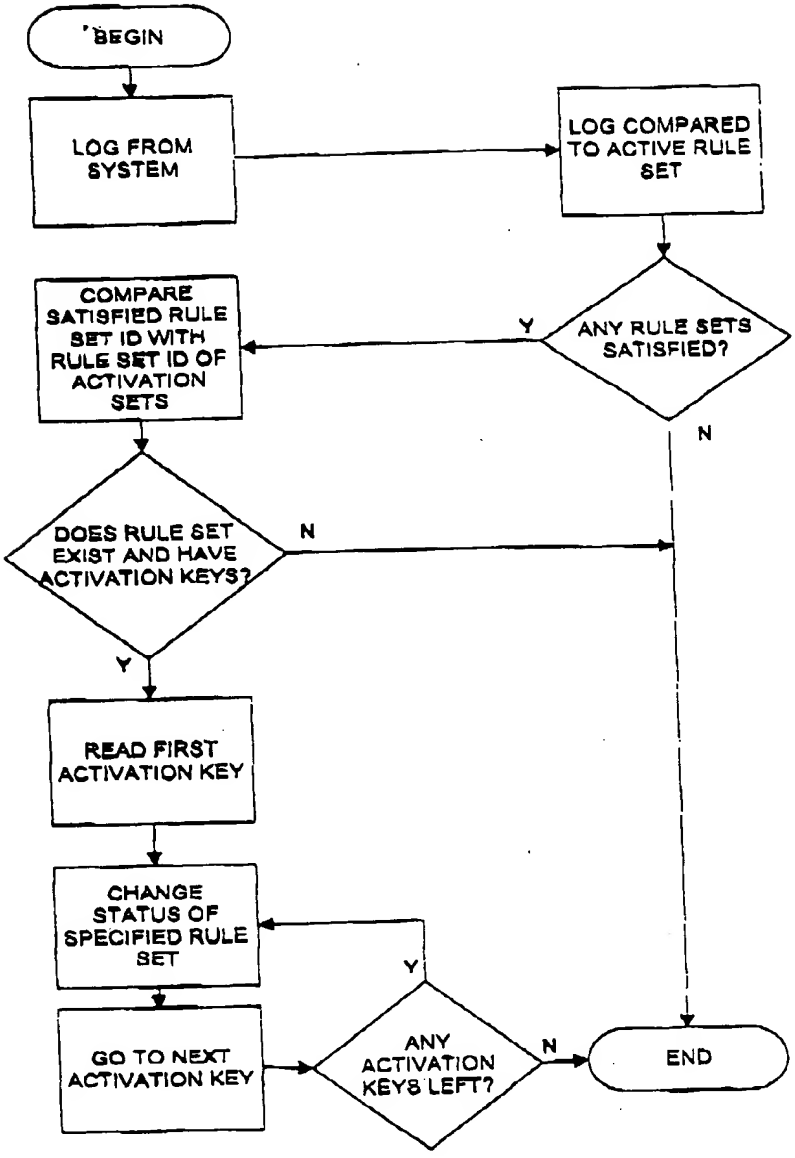
BEGIN
LOG FROM SYSTEM
LOG COMPARED TO ACTIVE RULE SET
ANY RULE SETS SATISFIED?
Y
N
COMPARE SATISFIED RULE SET ID WITH RULE SET ID OF ACTIVATION SETS
DOES RULE SET EXIST AND HAVE ACTIVATION KEYS?
N
Y
READ FIRST ACTIVATION KEY
CHANGE STATUS OF SPECIFIED RULE SET
Y
GO TO NEXT ACTIVATION KEY
ANY ACTIVATION KEYS LEFT?
N
END

Figure 5